# Hydrographic changes in the North Atlantic between 330 and 550 ka

## Alterações hidrográficas no Atlântico Norte durante o período de 330 a 500 ka

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Proxy records of IODP Site U1313 (41°N, 33°W; 3412 m) and core MD01-2446 (39°N, 12.6°W; 3570 m) offshore Portugal are used to reconstruct interglacial and glacial hydrographic conditions in the mid-latitudinal North Atlantic Ocean. Surface water temperatures are reconstructed based on the Mg/ Ca ratio in G. inflata shells. Deep-water conditions are referred from the benthic foraminifer stable isotope records. Nowadays, surface waters at both sites are derived from the Gulf Stream/ North Atlantic Drift and the deep water is North Atlantic Deep Water (NADW), respectively. Both sites experienced similar temperatures during interglacial Marine Isotope Stages (MIS) 11c and 13 and during glacial MIS 14 and 10. Interglacial deep-water conditions were similar with both sites being bathed by well-ventilated NADW conform to a strong Atlantic meridional overturning circulation (AMOC). During the second half of MIS 11c, surface water conditions at Site U1313, however, became more variable and colder earlier than off Portugal, probably due to advection of subpolar waters. Largest differences between the sites existed during glacial MIS 12 when surface water temperatures off Portugal were in general colder. Site MD01-2446 recorded, however, a better ventilated deep water in the eastern than in the western basin. Decoupling between surface and deep records is observed at Site U1313 during the MIS 12 glacial maximum. During the glacial maximum warmer surface waters already reached Site U1313 while the AMOC was still reduced (AABW presence) indicating that the surface water warming had no affect on the AMOC.

***Keywords**: North Atlantic, interglacials, climate change, NADW, AMOC.*

# Assessment of marine influence in the Ribeira da Laje estuary (Oeiras, Portugal): implications for the foraminifera and ostracoda assemblages

## Avaliação da influência marinha no estuário da Ribeira da Laje (Oeiras, Portugal): consequência na distribuição das associações de foraminíferos e ostracodos

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The influence of seawater in the lower section of Laje Creek was determined by measuring its physical and chemical characteristics and through the study of foraminifera and ostracoda assemblages distribution. Estuarine water measurements were made during high-water slack. To determine the composition of foraminifera and ostracoda assemblages, samples of sediment and algae were collected on the Laje channel and in tidal rock pools of the St° Amaro de Oeiras beach during low-tide.

The results show that, during high tide, an incipient salt edge enters the Ribeira da Laje up to 125 meters upstream, where estuarine water exhibits a partially mixed structure. Brackish water with a well-mixed structure may be followed almost to 350m upstream, close to the mark of mean high water neap (bottom altitude ≈ 1m).

The study of the foraminifera and ostracoda assemblages show that the lower estuary of the Ribeira da Laje is almost barren, probably because of the artificialization of its channel, that changed the natural conditions of the creek and introduced negative environmental impacts. However in the tidal rock pools with algae the assemblages are well represented both in number of individuals and species.

**Palavras chave**: foraminíferos, ostracodos, Ribeira da Laje, parâmetros físico-químicos, cunha salina.

***Keywords**: foraminifera, ostracoda, Ribeira da Laje, physical and chemical parameters, salt wedge.*